



# ENTERIC REDMOUTH DISEASE

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## INTRODUCTION

Enteric redmouth disease (ERM), an internal bacterial infection of fishes, is principally known for its occurrence in rainbow trout, in which it was first seen in Idaho in the 1950's. The causal organism was named *Yersinia ruckeri*.

## CLINICAL SIGNS

In early acute disease outbreaks, the affected trout are typically lethargic, do not feed, and have hemorrhages in and around the mouth, oral cavity, and at the bases of fins. Gill filaments also may be hemorrhagic and small hemorrhages may occur on the surface of the internal organs and in the lateral muscles. The lower intestine is often inflamed and filled with a thick yellowish fluid. One or both eyes may protrude (a condition known as "pop-eye"), have hemorrhages around the ocular cavity and iris, and commonly rupture. Fish that survive darken in color and seek shelter, or withdraw from other fish. In certain atypical infections, no hemorrhages develop around the mouth or gill cover; the fish simply darken and swim irregularly near the surface.

Enteric redmouth disease commonly causes sustained, low-level mortality that may eventually result in heavy losses. Large-scale and acute outbreaks sometimes occur when chronically infected fish are stressed by poor culture conditions.

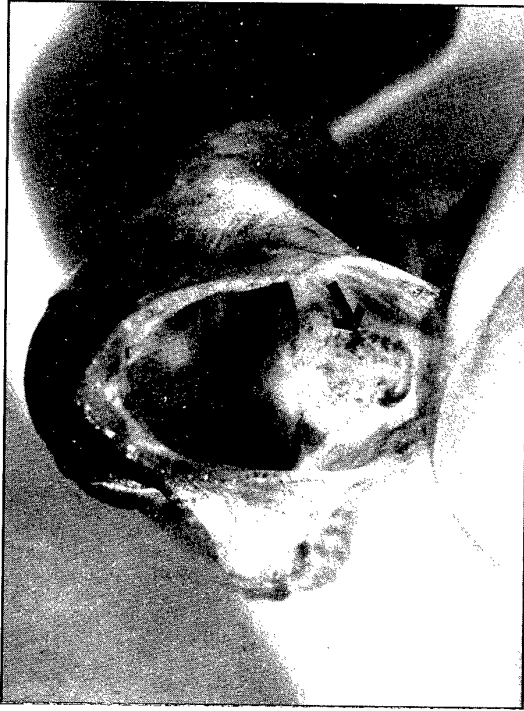
## DIAGNOSIS

Diagnosis of ERM is based on observations of clinical signs and isolation and identification of the causal bacterium, *Y. ruckeri*. Several laboratory tests are required for accurate identification.

## SOURCE AND RESERVOIR OF INFECTION

Although *Y. ruckeri* was first isolated in Idaho in the 1950's, it has now been established that the bacterium also was present in West Virginia and Australia at the same time; consequently the original source of the or-

## DTIC QUALITY INSPECTED 3



Typical hemorrhagic areas (arrow) on the tongue of a rainbow trout with enteric redmouth disease.

ganism is unknown. Rainbow trout that survive become asymptomatic carriers and serve as reservoirs of infection.

## MODE OF TRANSMISSION

Natural infections spread from fish to fish, or by exposure to carriers. Vertical transmission from parent to offspring has not been demonstrated and probably does not occur.

## INCUBATION PERIOD

Experimental evidence suggests that incubation time is 5 to 10 days at 56–59° F (13–15° C). In natural outbreaks, the incubation period is undoubtedly affected by stress and environmental factors such as temperature, pH, and dissolved oxygen.

## HOST AND GEOGRAPHIC RANGE

Since ERM was first reported, knowledge of the host and geographic ranges has increased. Spread of ERM from Idaho resulted from the transportation of carriers,

and within 20 years the disease had been spread to virtually all trout-producing regions of the United States and Canada. The disease has now been reported in most European countries where trout are cultured, but there have been no reports of outbreaks in Japan or New Zealand. The host range has expanded to include Atlantic salmon and Pacific salmon, and nonsalmonids such as emerald shiners, other minnows, goldfish, and farmed whitefish. Additionally, ERM infections have occurred in several farmed marine species such as turbot, seabass, and seabream.

## TREATMENT

Several antibiotics, including oxytetracycline, erythromycin, and the potentiated sulfonamide Romet, have been reported to be effective in controlling ERM. Although a 10-day treatment with oxytetracycline (Terramycin) at 2.5–3.0 g per 100 lb of fish per day for 10 days controls ERM outbreaks, no antibacterial is yet registered with the Food and Drug Administration for control of ERM in cultured food fish.

## SUGGESTED READING

Bullock, G. L. 1984. Enteric redmouth disease of salmonids. U.S. Fish and Wildlife Service, Fish Disease Leaflet 67. 14 pp.

A technical description of enteric redmouth disease of salmonids. Topics include diagnosis, pathology, host and geographic range, source and reservoir of infection, and incubation period and control.

**NOTE:** A fish disease specialist should be consulted for diagnostic assistance whenever a disease is suspected and before chemical treatments are used.

The use of chemicals or drugs on fish intended for human or animal consumption must be in accordance with current laws and regulations.

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